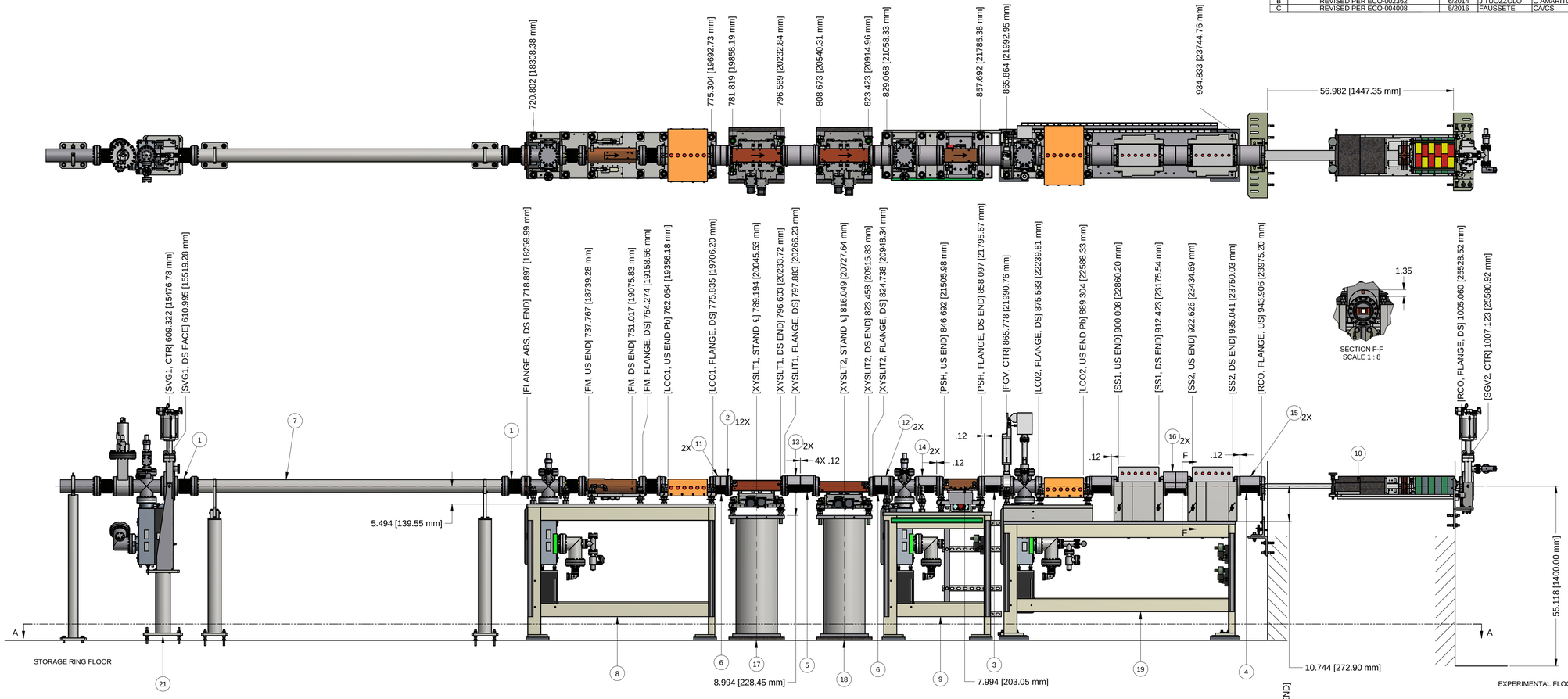
REVISION HISTORY					
REV	DESCRIPTION	DATE	DESIGNER	CHECKED BY	ENGINEER
A	RELEASE PER ECO 002199	4/2014	J TUOZZOLO	C AMARITO	C AMUNDSEN
B	REVISED PER ECO-002362	6/2014	J TUOZZOLO	C AMARITO	C AMUNDSEN
C	REVISED PER ECO-004008	5/2016	FAUSSETE	CA/CS	BREITFELLER



COMPONENT	RADIATION SAFETY COMPONENT	TOP OFF SAFETY COMPONENT
EXIT ABSORBER	X	X
FIXED MASK	X	X
BURN THRU 1	X	
LEAD COLLIMATOR 1	X	
LEAD COLLIMATOR 2	X	X
SAFETY SHUTTER 1	X	
SAFETY SHUTTER 2	X	
RATCHET WALL COLLIMATOR	X	

ITEM	QTY	PART NUMBER	DESCRIPTION
21	1	SR-VA-CHM-3210	EXIT CHM SUBASSY, UNDULATORS (S3)
19	1	SR-FE-SS-3100	ASSY, SAFETY SHUTTER, ESM BEAMLINE
18	1	SR-FE-SLT-1450	SLIT,ASSEMBLY
17	1	SR-FE-SLT-1400	SLIT,ASSEMBLY
16	2	SR-FE-SHLD-0002	BELLOWS SHIELD, 3.63" LONG
15	2	SR-FE-SHLD-0001-07	BELLOWS SHIELD, 6.50 lg.
14	2	SR-FE-SHLD-0001-06	BELLOWS SHIELD, 5.50 lg
13	2	SR-FE-SHLD-0001-05	BELLOWS SHIELD, 4.50 lg.
12	2	SR-FE-SHLD-0001-02	BELLOWS SHIELD, 2.50 lg.
11	2	SR-FE-SHLD-0001-01	BELLOWS SHIELD, 2.10 lg.
10	1	SR-FE-RCO-3110	RATCHET WALL COLLIMATOR, ESM
9	1	SR-FE-PSH-3000	PHOTON SHUTTER ASSEMBLY, EPU
8	1	SR-FE-MSK-3100	FIXED MASK, ASSY, ESM BEAMLINE
7	1	SR-FE-DRFT-1211	DRIFT PIPE, CANTED SHORT STRAIGHT ASSY
6	2	SR-FE-BLW-0045	WELDED, BELLOWS, 6" CF FLG
5	1	SR-FE-BLW-0044	WELDED, BELLOWS, 6" CF FLG
4	1	SR-FE-BLW-0039	WELDED, BELLOWS, 6" CF FLG
3	1	SR-FE-BLW-0023	WELDED, BELLOWS, 6" CF FLG
2	12	PI-CLMP-0056	Stainless Steel Worm-Drive hose clamp 4-1/8 to 7" clamp diameter range
1	2	PI-BLW-0021	BELLOWS, FORMED, 4" ID 6" CF FLANGE

PARTS LIST

NOTES:

1. ALL ORDINATE DIMENSIONS ARE FROM MID-PONT OF INSERTION STRAIGHT
2. USE DRILLING FIXTURE SR-FE-FIX-5111 FOR ALL HOLES IN FLOOR.
3. SEE SHEET 2 FOR SURVEY AND ALIGNMENT DIMENSIONS.
4. COMPONENT POSITION TOLERANCE OF ± .008 [.200] IN X AND Y DIRECTION AND ± .020 [.500] IN Z DIRECTION (BEAM DIRECTION)

TOP OFF SAFETY CREDITED COMPONENT OR ASSEMBLY.
ANY CHANGES TO THIS DRAWING REQUIRES APPROVAL OF
THE TECHNICAL AUTHORITY FOR TOP OFF SAFETY.

21-ID BEAMLINE

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES
DIMENSIONS IN BRACKETS [xx.xx] ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED
INTERPRET DRAWING PER ASME Y14.5-1994 OR YSLI-1975
DIMENSIONAL TOLERANCES: X. ± 0.060 ; X.X ± 0.030 ; X.XX ± 0.015 ; X.XXX ± 0.005
ANGULAR TOLERANCE: ± 5°
SURFACE FINISH: 125
BREAK EDGES & SHARP CORNERS 0.005 MIN. TO 0.030 MAX.

BROOKHAVEN NATIONAL LABORATORY
BROOKHAVEN SCIENCE ASSOCIATES
UPTON, NEW YORK 11973
Exploring Life's Mysteries, Protecting its Future

NSLS-II NATIONAL SYNCHROTRON LIGHT SOURCE II

DRAWN BY:	J TUOZZOLO	9/16/2013
CHECKED BY:	C. AMARITO	4/2014
VACUUM APPROVAL	H H SEUH	4/2014
ENGINEER APPROVAL	C AMUNDSEN	4/2014
SUPERVISOR APPROVAL	S SHARMA	4/2014
ESM APPROVAL	A ACKERMAN	4/2014
QA APPROVAL	J HAWKES	4/2014

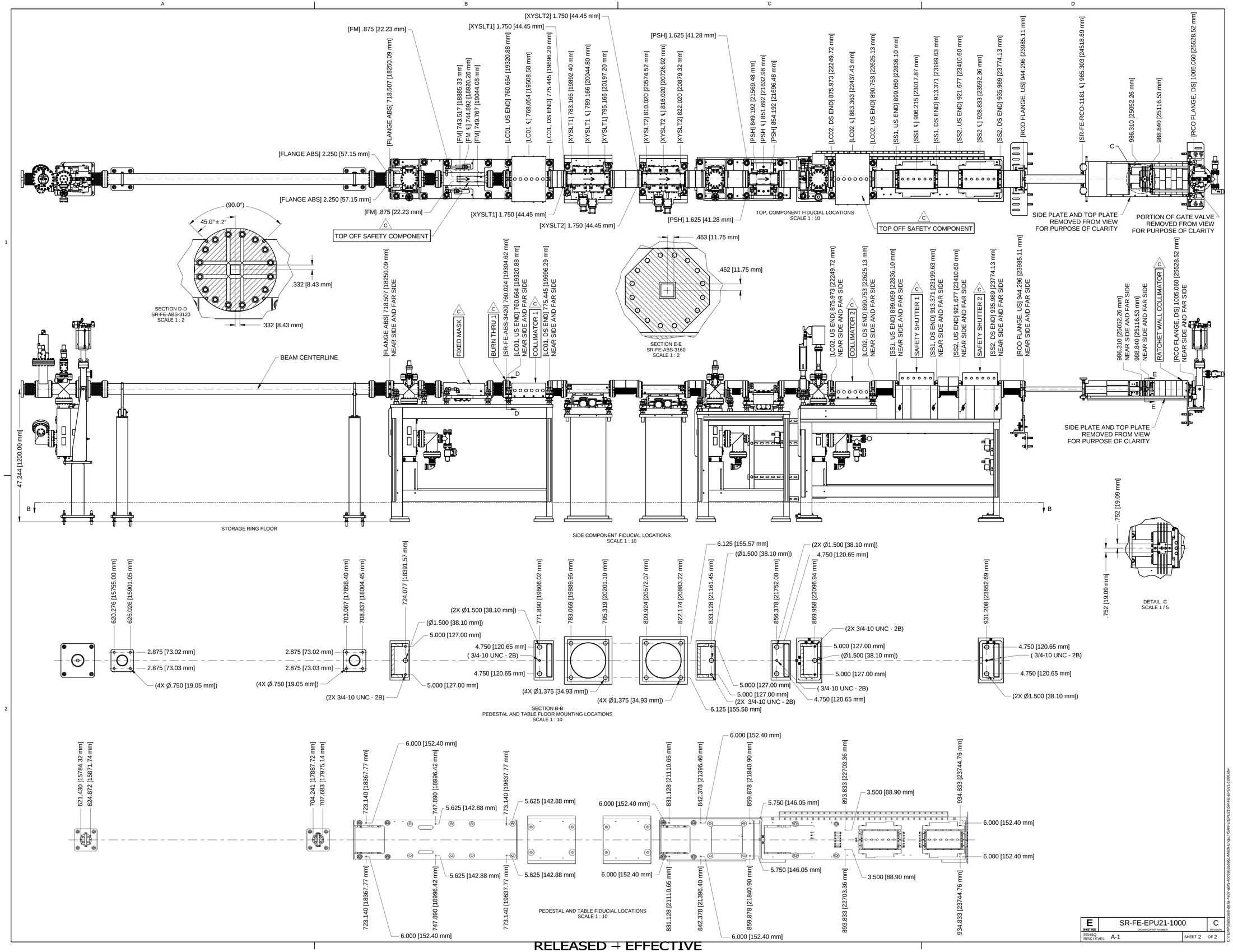
STORAGE RING
FRONT END, EPU21
Short Straight Front End (ESM)

SHEET SIZE: E	DRAWING/PART NUMBER: SR-FE-EPU21-1000	REVISION: C	
ESH&Q RISK LEVEL: A-1		SHEET 1	OF 2

NEXT ASSY:
PROJECT: NSLS-II
THIRD ANGLE PROJECTION
SCALE: SEE DWG VIEW
WBS# 1.03.04.07.03

C:\TEMP\SolidWorks\ff-ff7fa-4c37-bffb-A0F85b5d5f3b\Mech Fnsh_TS\SR\FE\EPU21\SR-FE-EPU21-1000.slw

RELEASED + EFFECTIVE


[FM] .875 [22.23 mm]
[XYSLT1] 1.750 [44.45 mm]
[XYSLT2] 1.750 [44.45 mm]
[PSH] 1.625 [41.28 mm]
[FLANGE ABS] 718.507 [18250.09 mm]
[FM] 743.517 [18885.33 mm]
[FM ¶ 744.892 [18920.26 mm]
[FM] 749.767 [19044.08 mm]
[LC01, US END] 760.664 [19320.88 mm]
[LC01 ¶ 768.054 [19508.58 mm]
[LC01, DS END] 775.445 [19696.29 mm]
[XYSLT1] 783.166 [19892.40 mm]
[XYSLT1 ¶ 789.166 [20044.80 mm]
[XYSLT1] 795.166 [20197.20 mm]
[XYSLT2] 810.020 [20574.52 mm]
[XYSLT2 ¶ 816.020 [20726.92 mm]
[XYSLT2] 822.020 [20879.32 mm]
[PSH] 849.192 [21569.48 mm]
[PSH ¶ 851.692 [21632.98 mm]
[PSH] 854.192 [21696.48 mm]
[LC02, DS END] 875.973 [22249.72 mm]
[LC02 ¶ 883.363 [22437.43 mm]
[LC02, US END] 890.753 [22625.13 mm]
[SS1, US END] 899.059 [22836.10 mm]
[SS1 ¶ 906.215 [23017.87 mm]
[SS1, DS END] 913.371 [23199.63 mm]
[SS2, US END] 921.677 [23410.60 mm]
[SS2 ¶ 928.833 [23592.36 mm]
[SS2, DS END] 935.989 [23774.13 mm]
[RCO FLANGE, US] 944.296 [23985.11 mm]
[SR-FE-RCO-1181 ¶ 965.303 [24518.69 mm]
986.310 [25052.26 mm]
988.840 [25116.53 mm]
[RCO FLANGE, DS] 1005.060 [25528.52 mm]
[FLANGE ABS] 2.250 [57.15 mm]
TOP OFF SAFETY COMPONENT
TOP, COMPONENT FIDUCIAL LOCATIONS
SCALE 1 : 10
SIDE PLATE AND TOP PLATE REMOVED FROM VIEW FOR PURPOSE OF CLARITY
PORTION OF GATE VALVE REMOVED FROM VIEW FOR PURPOSE OF CLARITY
(90.0°)
45.0° ± .2°
.332 [8.43 mm]
SECTION D-D
SR-FE-ABS-3120
SCALE 1 : 2
.463 [11.75 mm]
.462 [11.75 mm]
SECTION E-E
SR-FE-ABS-3160
SCALE 1 : 2
BEAM CENTERLINE
[FLANGE ABS] 718.507 [18250.09 mm] NEAR SIDE AND FAR SIDE
FIXED MASK
BURN THRU 1
[SR-FE-ABS-3420] 760.024 [19304.62 mm]
[LC01, US END] 760.664 [19320.88 mm] NEAR SIDE AND FAR SIDE
COLLIMATOR 1
[LC01, DS END] 775.445 [19696.29 mm] NEAR SIDE AND FAR SIDE
[LC02, US END] 875.973 [22249.72 mm] NEAR SIDE AND FAR SIDE
COLLIMATOR 2
[LC02, DS END] 890.753 [22625.13 mm] NEAR SIDE AND FAR SIDE
[SS1, US END] 899.059 [22836.10 mm] NEAR SIDE AND FAR SIDE
SAFETY SHUTTER 1
[SS1, DS END] 913.371 [23199.63 mm] NEAR SIDE AND FAR SIDE
[SS2, US END] 921.677 [23410.60 mm] NEAR SIDE AND FAR SIDE
SAFETY SHUTTER 2
[SS2, DS END] 935.989 [23774.13 mm] NEAR SIDE AND FAR SIDE
[RCO FLANGE, US] 944.296 [23985.11 mm] NEAR SIDE AND FAR SIDE
986.310 [25052.26 mm] NEAR SIDE AND FAR SIDE
988.840 [25116.53 mm] NEAR SIDE AND FAR SIDE
RATCHET WALL COLLIMATOR
[RCO FLANGE, DS] 1005.060 [25528.52 mm] NEAR SIDE AND FAR SIDE
SIDE PLATE AND TOP PLATE REMOVED FROM VIEW FOR PURPOSE OF CLARITY
47.244 [1200.00 mm]
STORAGE RING FLOOR
SIDE COMPONENT FIDUCIAL LOCATIONS
SCALE 1 : 10
.752 [19.09 mm]
DETAIL C
SCALE 1 / 5
620.276 [15755.00 mm]
626.026 [15901.05 mm]
703.087 [17858.40 mm]
708.837 [18004.45 mm]
724.077 [18391.57 mm]
771.890 [19606.02 mm]
783.069 [19889.95 mm]
795.319 [20201.10 mm]
809.924 [20572.07 mm]
822.174 [20883.22 mm]
833.128 [21161.45 mm]
856.378 [21752.00 mm]
869.958 [22096.94 mm]
931.208 [23652.69 mm]
6.125 [155.57 mm]
(Ø1.500 [38.10 mm])
(2X Ø1.500 [38.10 mm])
4.750 [120.65 mm]
(2X 3/4-10 UNC - 2B)
5.000 [127.00 mm]
(3/4-10 UNC - 2B)
2.875 [73.02 mm]
2.875 [73.03 mm]
(4X Ø.750 [19.05 mm])
(4X Ø.750 [19.05 mm])
(4X Ø1.375 [34.93 mm])
6.125 [155.58 mm]
SECTION B-B
PEDESTAL AND TABLE FLOOR MOUNTING LOCATIONS
SCALE 1 : 10
621.430 [15784.32 mm]
624.872 [15871.74 mm]
704.241 [17887.72 mm]
707.683 [17975.14 mm]
723.140 [18367.77 mm]
747.890 [18996.42 mm]
773.140 [19637.77 mm]
6.000 [152.40 mm]
5.625 [142.88 mm]
831.128 [21110.65 mm]
842.378 [21396.40 mm]
859.878 [21840.90 mm]
893.833 [22703.36 mm]
934.833 [23744.76 mm]
5.750 [146.05 mm]
3.500 [88.90 mm]
PEDESTAL AND TABLE FIDUCIAL LOCATIONS
SCALE 1 : 10
E
SR-FE-EPU21-1000
C
SHEET SIZE
DRAWING/PART NUMBER
REVISION
ESH&Q RISK LEVEL
A-1
SHEET 2 OF 2
RELEASED + EFFECTIVE